1st Technical ESMValTool Workshop 2021

The Technical ESMValTool Workshop took place via video call from 4-6 May 2021 with 23 participants from BSC, DLR, ETH, Met Office, NLeSC, PML, SMHI, U Bremen and U Reading. The main goal of the workshop was to bring together the development community, discuss future strategies and provide updates on progress since the last workshop in November 2020. Specifically, the workshop included the following topics and presentations:

- Overview and strategy for merging IPCC AR6 diagnostics into the official release
- ESMValTool June release (v2.3.0)
- General discussion on the following topics: naming of versions, support of new NCL diagnostics, automated formatting, ETCCDI, import of native model output, gallery, website
- ESMValTool related IS-ENES3 tasks and deliverables
- Reviewing and merging open pull requests
- Presentation: Introduction of new teams and updates on governance and future strategy
- Presentation: Update on improving automated testing of diagnostics
- Presentation: Update on Jupyter Notebook capabilities for the ESMValTool

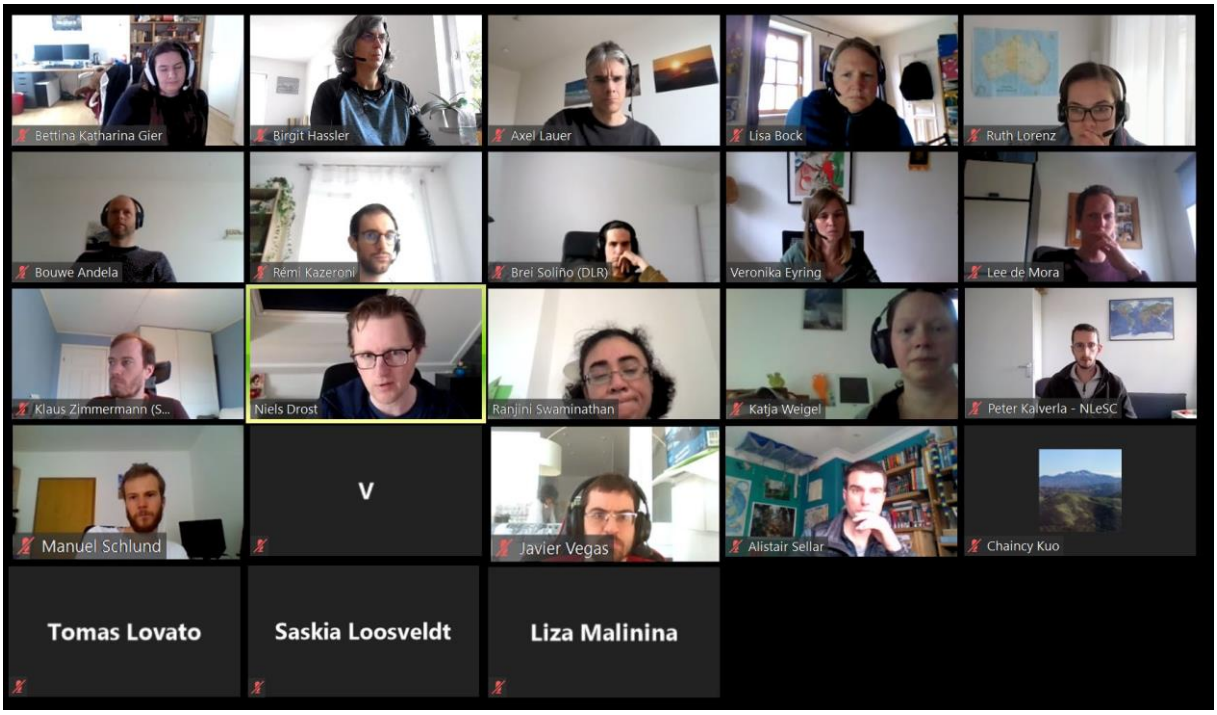

Figure 1 Participants of the Technical ESMValTool Workshop in May 2021.

Overview and strategy for merging IPCC AR6 diagnostics into the official release

In this session it was discussed how to proceed with IPCC AR6 diagnostics implemented into the ESMValTool. The source code currently resides in a private repository. The aim is to make the code open source.

It has been decided that the ESMValTool code for IPCC AR6 will be released in two steps:

1. The original code that was used to produce the final IPCC figures will be collected and stored.
2. The recipes and diagnostics will be updated and merged into the public ESMValTool version.

It has been further decided that a document summarizing the instructions on what needs to be done by IPCC AR6 developers for both steps will be created. The authors of the diagnostics will be supported by at least one person from the technical ESMValTool development team who is also a Contributing Author on one of the IPCC AR6 chapters.

ESMValTool June release (v2.3.0)

The discussion covered the upcoming June release of the ESMValCore and ESMValTool (v2.3.0).

- Developers willing to have their pull requests merged by the code freeze should mark the corresponding issues as v2.3.0 milestone.
- Emphasized to encourage authors of pull requests to use an informative description and tick the check list that will be reviewed by the reviewer.
- It was suggested that the core development team should meet to coordinate the content of the next release shortly after the release has been made.
- Reducing the number of releases from 3 to 2 per year: having less releases (2 per year) may give more time to developers and scientists to work on their code. It would also require less time to manually test all the recipes prior to the releases. But reducing the number of releases could result in more work regarding the package maintenance. A general agreement was found to keep the number of releases to 3 per year.

General discussion

The general discussion covered several topics which are listed below. The main conclusions / suggestions for each topic are summarized below.

Naming of versions

So far, semantic-like versioning has been used for new ESMValTool releases (e.g. v2.1.0). It has discussed whether switching to calendar versioning (e.g. 2021-06) would be a good option.

- “v2” should be kept in the version name because it has been used in the published description papers
- It might be an option to combine semantic versioning and calendar versioning, e.g. v2.2021.06
- Discussion on GitHub: https://github.com/ESMValGroup/ESMValTool/discussions/2158

Support of new NCL diagnostics

As NCAR recently announced to suspend future development of NCL, the question was raised whether new diagnostics written in NCL should still be accepted for new releases.

- Accepting new NCL diagnostics: keep bar low for science contributions, i.e. continue to accept new NCL diagnostics as long as NCL still works within the ESMValTool distribution
- For new CMORizers, no general agreement was found; some developers prefer Python-only.
- Suggestion: include contributing guidelines including recommendations for keeping contributions alive in the long run into the documentation / tutorial
- Discussion on GitHub: https://github.com/ESMValGroup/ESMValTool/discussions/2160

Automated formatting

It was discussed whether tools for automated formatting of Python code should be introduced to obtain more homogeneous looking code.

- There were no conclusions about changing existing tools or introducing new rules.
- GitHub discussion: https://github.com/ESMValGroup/ESMValTool/discussions/2161

ETCCDI package

Replacing the R package "ETCCDI" (Expert Team on Climate Change Detection and Indices) has been proposed because of license and performance issues.

- Current status: work started to create a Python version but work has not been finished
- ETCCDI can (theoretically) be now included in the ESMValTool environment; license issue remains; how do we go on?
    - One ETCCDI related R package not available from CRAN
    - ICCLIM (https://icclim.readthedocs.io/en/latest/intro.html) developed within IS-ENES3 (Python) could be a possible alternative to ETCCDI
    - License issue affects many (all?) R dependencies
    - SMHI is working on something similar to ETCCDI, but recommend to not wait for it
    - Conclusions:
        - First decide on reason for changing ETCCDI (license, performance, reference) to choose strategy
        - Contact (again) successors of ETCDDI people (original team has been discontinued) and inquire about updates or Python versions available
- GitHub discussion: https://github.com/ESMValGroup/ESMValTool/discussions/2163

Import of native model output

The technical strategy for importing native model output (e.g. from ICON, UK-ESM) has been discussed.

- Full / half day discussion / coding day in the week 10-15 May 2021 for interested developers
- SMHI creates doodle poll for finding date: https://github.com/ESMValGroup/ESMValCore/issues/1119

Gallery

There a currently two galleries: an automatically created gallery as part of the ESMValTool documentation and a gallery on the ESMValTool website containing only selected examples.

- Improve finding of diagnostics for users (put item on agenda for next workshop)

- Regularly update gallery on website
- Scientific lead team highlights 1-2 plots to be put on / update gallery on website
- GitHub discussion: https://github.com/ESMValGroup/ESMValTool/discussions/2166

Website

The ESMValTool website is currently hosted and maintained by DLR. This makes contributions e.g. about training events difficult for other people.

- Long-term aim: move website to "GitHub Pages" to allow for easier contributions / updates
- Possibly use Jekyll to create website
- Suggestion: add info on user mailing list to website (https://github.com/ESMValGroup/ESMValTool/discussions/2166)

Contribution to COP26 hackathon

The user engagement team reported about the upcoming COP26 hackathon.

- COP26 hackathon: use climate model data and write diagnostics for specific regions and applications
- Focus: energy efficiency
- Are ESMValTool developers interested in joining and helping participants developing diagnostics (2-3 people for 1 week)?
- Contact user engagement team for details
- Details at https://eng.ox.ac.uk/events/energy-climate-data-hackathon/

Presentations

Three presentations were given on the topics "new teams, updates on governance and future strategy", "improving automated testing of diagnostics" and "Jupyter Notebook capabilities for the ESMValTool". These presentations provided updates and an overview on the current status as base for plenary discussions. In the following, the outcome from these discussions is briefly summarized.

Introduction of new teams and updates on governance and future strategy

- Facilitate interactions between the teams, by having some cross-team meetings with delegates from the teams (technical lead team, science lead team, user engagement team).
- At future workshops, have a report from each team.

Suggestions

- Create a standard phrase for people to use in papers to acknowledge the ESMValTool and add phrase to tutorial / website / documentation.
- Have the three teams present an overview of their discussions and decisions at the workshops from now on.
- Have a strategy discussion at every workshop, with input from all teams.
- Teams should think about strategy where we want to go (for their part of the project and in terms of ToRs) and nominate a delegate for a cross-team discussion.

Update on improving automated testing of diagnostics

- Automated testing of diagnostics urgently needed

- ESMValTool Bot is useful but needs to be improved (e.g. crashing / hanging job prevents other users from using the bot, currently no possibility to use development versions of ESMValCore)
- For releases: test full recipes
- Daily / weekly / monthly tests: use “light” recipes (reduced number of datasets / years) for more frequent testing
- Discussion needed (github, technical lead team) how to create “light” recipes from original recipes

Update on Jupyter Notebook capabilities for the ESMValTool

The presentation covered the following topics:

- Possibility to run the ESMValTool on JupyterHub at DKRZ
- On the DKRZ JupyterHub there are now “ESMValTool” kernels available
- There are examples available on GitHub on how to run an ESMValTool example recipe in the Jupyter Notebook environment, how to run an existing scientific recipe, and how to interactively create a new recipe
- Work on implementing things in a Jupyter Notebook environment are finished for now, and can be tested
- More information and instructions are available on: https://github.com/ESMValGroup/ESMValTool-JupyterLab

ESMValTool related IS-ENES3 tasks and deliverables

- D9.2 - ESMValTool version enabling model development usage (Met Office): Alistair Sellar is looking for internal reviewers. Stéphane Sénesi is testing ESMValTool at IPSL and he will discuss the issues found during the current workshop.
- D9.3 - ESMValTool version with ESGF coupling and distributed computation features (UREAD): A previous meeting to discuss how to apply WPS in ESMValTool has been very useful. Ideas for reviewers were proposed.
- D9.4 - ESMValTool version supporting regional climate models and different timescales (BSC): CMCC is presenting their experience when using Euro Cordex models with ESMValTool using Synda to retrieve the data. A session to discuss these results has been scheduled.
- Other: A workshop is organized by WP5 to gather a list of requirements to a fast and scalable evaluation workflow. All WP9 partners are invited to attend. The outcome of this workshop should be used as input for WP9 T1.

Reviewing and merging open pull requests

- A GitHub milestone has been created to highlight pull requests that are needed for the June 2021 release of the ESMValTool (v2.3.0).
- Prioritizing review and merging of pull requests is still an open topic and needs more discussion.
- More reviewers are needed to handle the number of pull requests in a timelier manner.

The workshop was funded by the EU Horizon 2020 research and innovation programme under the grant agreement No 824084 (IS-ENES3 project).

Agenda Technical ESMValTool Workshop

(via video call, all times are given in CEST)

4 May 2021 - Day 1

10.00 am – 10.15 am Introduction and Welcome (Birgit)
10.15 am – 10.45 am Overview workshop topics (Axel)
10.45 am – 11.45 am Discussion on merging pull requests / tasks to do
11.45 am – 12.30 pm Working on self-assigned tasks; communication via Gitter
12.30 pm – 01.30 pm Lunch break (opportunity to virtually hang out with fellow workshop participants)
01.30 pm – 02.45 pm Working on self-assigned tasks; communication via Gitter
02.45 pm – 03.00 pm Coffee break (opportunity to virtually hang out with fellow workshop participants)
03.00 pm – 03.30 pm A) IS-ENES3 side meeting (Rémi)
03.00 pm – 03.30 pm B) Working on self-assigned tasks; communication via Gitter
03.30 pm – 05.00 pm IPCC AR6 (Lisa, Lee, Ruth, Klaus, et al.)
05.00 pm – 06.00 pm Summary and wrap up of first day

5 May 2021 - Day 2

10.00 am – 10.15 am Introduction day 2 and open questions (Birgit)
10.15 am – 12.30 pm A) Working on self-assigned tasks; communication via Gitter
11.30 am – 12.30 pm B) Discussion on ESMValTool June release (Klaus)
12.30 pm – 01.00 pm Lunch break (opportunity to virtually hang out with fellow workshop participants)
01.00 pm – 02.00 pm A) Working on self-assigned tasks; communication via Gitter
01.00 pm – 02.00 pm B) General discussion 1 (Bouwe) (naming of versions, support of new NCL diagnostics, automated formatting, etc.)
02.00 pm – 03.00 pm Introduction of new teams and future strategy (Alistair)
03.00 pm – 03.30 pm Update on improving automated testing of diagnostics (Niels)
03.30 pm – 03.45 pm Coffee break (opportunity to virtually hang out with fellow workshop participants)
03.45 pm – 05.30 pm Working on self-assigned tasks; communication via Gitter
05.30 pm – 06.00 pm Summary and wrap up of second day
07.30 pm – Virtual social event

6 May 2021 - Day 3

10.00 am – 10.15 am Introduction day 3 and open questions (Birgit)
10.15 am – 12.30 pm Working on self-assigned tasks; communication via Gitter

12.30 pm – 01.30 pm Lunch break (opportunity to virtually hang out with fellow workshop participants)

01.30 pm – 02.30 pm Working on self-assigned tasks; communication via Gitter

02.30 pm – 03.00 pm Update on Jupyter Notebook capabilities for the ESMValTool (Peter)

03.00 pm – 03.15 pm Coffee break (opportunity to virtually hang out with fellow workshop participants)

03.15 pm – 05.00 pm General discussion 2 (Bouwe) (summary of general discussion 1, strategy on dataset fixes, ETCCDI, import of native model output, gallery, website, etc.)

05.00 pm – 05.30 pm Wrap up